Operation and Maintenance Of
Natare Movable Bulkheads
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Congratulations! Your new swimming pool facility incorporates equipment and systems fabricated from stainless steel, the most durable and trouble free material available for use in a swimming pool environment.

Introduction to Operational and Maintenance Procedures
This booklet is designed to assist the operator in the proper procedures and maintenance techniques to successfully operate the Natare Movable Bulkhead System. It is essential that the Owner and Operator understand the necessity for a trained and competent swimming pool operator who has full and complete understanding of the use, care and maintenance of the bulkhead system.

Your pool has been equipped with a custom fabricated Natare Movable Bulkhead System. In order to ensure that your bulkhead system continues to serve you well for many seasons, it is necessary that you strictly adhere to the maintenance and operation instructions detailed herein.

Should you encounter an unusual condition or problem with your Natare Movable Bulkhead System, immediately contact Natare Corporation or your authorized builder/distributor for assistance.

Failure to provide ongoing conscientious operation and maintenance of this equipment will result in equipment failure, improper performance or equipment damage and could cause injury to swimmers or staff. Such neglect, abuse or improper operation IS NOT COVERED BY YOUR WARRANTY.

Safety and Warning Information

Natare Movable Bulkheads are custom designed for each installation and are intended for use with a particular pool structure. Since the bulkhead is associated with the surrounding structure, gutter and wall construction, the same safety procedures followed for the swimming pool should be enforced for the bulkhead. Listed below are some of the more common safety precautions.

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WARNING
IMPROPER OPERATION AND USE OF A MOVING BULKHEAD CAN BE HAZARDOUS. PROPER SUPERVISION AND SAFETY PRACTICES ARE ESSENTIAL. SERIOUS INJURY OR DEATH CAN RESULT FROM IMPROPER BULKHEAD USE OR INADEQUATE SUPERVISION.

NOTE: This list contains recommended safety rules for Natare Bulkheads. Since every facility has different characteristics, DO NOT consider this a complete list of safety rules or precautions. Those responsible for the operation and safety at each swimming facility MUST develop their own safety practices and procedures (which should include the following) and encourage all staff members to follow and enforce safety guidelines.

READ THIS! 🚨

SPECIAL INFORMATION—PLEASE READ
Moving Bulkheads are NOT intended as play structures or for use by recreational swimmers. Moving bulkheads are intended for use by trained individuals in carefully supervised and controlled environments. Never allow ANYONE to play on or around a moving bulkhead.
1. **DO NOT** dive from the bulkhead. The exception to this rule is when the structure is being used for competitive swimming, training, or when starting platforms are provided. This exception should only be applied under professional supervision.

2. **DO NOT** allow swimming under the bulkhead.

3. **DO NOT** allow anyone to run, jump or rough play on the bulkhead.

4. **DO NOT** allow anyone or anything on the bulkhead when it is being moved or when the bulkhead is not locked in position with the anchors.

5. **DO NOT** use or allow the bulkhead to be used as a work platform.

6. **DO NOT** use or allow the bulkhead to be used as a support, a staging area, awards platform or seating area.

7. **DO NOT** allow unauthorized or unqualified persons to move the bulkhead.

## Bulkhead Usage

The Natare Movable Bulkhead is designed to allow a swimming pool to be adapted to various lengths as needed for competitive swimming and other pool activities. The bulkhead is designed to be a movable pool divider. It can be used to separate various swimming and non-swimming groups, which provides additional safety over ordinary safety lines. During normal recreational use and competitive swimming, attention should be directed to the following procedures and safety precautions. _Natare has made every effort to provide a properly constructed bulkhead, but we cannot control the use of this structure. The responsibility for proper operation, supervision and maintenance is the responsibility of the owner and pool administration._

Moving bulkheads are structures intended for use in carefully supervised aquatic environments in conjunction with specific programs requiring differing course lengths. A moving bulkhead may not be appropriate for all activities that occur in a swimming pool or aquatic environment. For that reason, bulkheads should only be used under the supervision of experienced aquatics professionals with the skill and experience to properly utilize the bulkhead system and determine its appropriateness and safety.

The Natare Movable Bulkhead is a box truss structure that provides a movable swimming pool partition. When properly located and secured at an anchoring position, the bulkhead structure is capable of supporting swimmers on its surface and provides a rigid end-wall for competitive swimming. Its ample open area ensures the bulkhead’s flow through capacity and contributes to the mobility of the bulkhead. The buoyancy chambers offset 75% of the bulkhead’s weight at all times. These compartments provide additional stability to the structure.

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**READ THIS!**

Since the bulkhead utilizes buoyant forces for support, it is not intended to be used as a work platform or a walkway, particularly when the pool is empty of water. Such misuse could result in damage to the structure or injury to persons on or around the bulkhead structure.
The Natare Movable Bulkhead is designed for use only when the pool is at the proper water level. **If the pool is drained for any period of time, it is recommended that the bottom of the bulkhead be adequately braced, shored and supported from underneath.** In addition to the bottom supports, the bulkhead should be barricaded to prevent people from walking on it. While the bulkhead is fully capable of supporting its own weight in an empty pool, the wall structure or supporting deck areas may not be designed to sustain such a load.

**READ THIS!**

**WARNING**

NEVER ALLOW A BULKHEAD TO REMAIN UNSUPPORTED OR ACCESSIBLE WHEN THE POOL IS EMPTY OF WATER.

**Moving Your Bulkhead**

Natare’s Movable Bulkheads should only be used or moved when the water is at the proper water level for the pool’s design. Operating your pool at higher or lower water levels can interfere with proper operation and cause damage to the bulkhead or injury to swimmers.

**READ THIS!**

**WARNING**

ONLY MOVE A BULKHEAD WHEN THE POOL WATER IS AT THE PROPER LEVEL. NEVER ATTEMPT TO MOVE A BULKHEAD WHEN THE POOL IS EMPTY OF WATER.

When the bulkhead is moved to a different anchoring position, the following steps should be followed:

1) All swimmers should be asked to leave the pool area.

2) No persons should be on or around the bulkhead, other than personnel involved in moving or positioning the bulkhead. No one should stand or walk on the bulkhead while it is being moved.

3) Detach all racing lanes, safety lanes, and other devices attached to the structure’s sides.

4) Remove any anchor covers from the desired relocation position.

5) Remove any obstacle in the path of the bulkhead between the present location and new anchoring positions. This may include ladders, stanchions or starting blocks.

Detach bulkhead from the current anchoring position. Never force the anchoring bolts or day-pins. Use only approved tools and socket wrenches.
Bulkhead parts and anchoring system

1-barrier rail or stanchion socket cover  2-air release tube  3-cover removal tool  4-day pin anchor  5-Bronze competition bolt  6-competition bolt deck anchor  7-day pin anchor sleeve

**READ THIS!**

NEVER USE EXTENSIONS, BREAKER BARS OR OTHER MEANS TO MOVE A BOLT OR DAY-PIN THAT APPEARS TO BE STUCK. USE THREAD LUBRICANTS AND LOW PRESSURE AIR TOOLS IF ADDITIONAL TORQUE IS REQUIRED.

Your bulkhead uses the Natare variable buoyancy inflation system, and you must observe the following steps.

**Typical views of bulkhead anchoring and carriage system (yours may be slightly different)**

1-competition bolt anchor and bolt  2-day pin anchor  3-push bar socket
4-air connection

1) Remove the anchor socket cover.
2) Remove the anchor bolts or day-pins first!!
3) Once the anchor bolts or day-pins are removed, attach the compressor hose quick connect to the inflation port and slowly add air until the bulkhead rises to the desired level indicating that the weight is off the bearing pads. Only when these steps are accomplished proceed to SLOWLY move the bulkhead forward towards the new anchoring position as follows:

**READ THIS!**

Note: adding air to an anchored bulkhead will cause damage to the anchoring system and structure.

4) Insert the push bar into the anchor socket at each end of the bulkhead
5) One person should be positioned at each end of the bulkhead. Gently push forward on the push bar towards the direction the bulkhead is to be moved. Steady uniform force should be applied. If the bulkhead rotates forward, you are pushing to forcefully. Move the bulkhead SLOWLY.
6) Keep the bulkhead perpendicular to the pool wall at all times.

7) Be prepared to stop the bulkhead at any time in the event a problem or obstacle should arise.

**NOTE:** Momentum will continue to move the bulkhead forward even though no force is being applied to it. Therefore, you should anticipate your stopping position and begin slowing down the movement of the bulkhead before you reach your final stopping position.

8) Once you have moved the bulkhead to the desired anchoring position, open the bulkhead buoyancy chamber air release by inserting the air release tube and allow air to escape. The bulkhead will settle into place on the gutter or pool surround.

9) Once the bulkhead is firmly settled, anchor the bulkhead in the new position using the anchor bolts or day-pins.

**READ THIS!**

**INSERT ANCHORING BOLTS OR DAY-PINS CAREFULLY TO AVOID CROSS THREADING. NEVER FORCE OR OVERTIGHTEN BOLTS. NEVER USE EXTENSIONS TO TIGHTEN BOLTS. IF YOUR BULKHEAD DOES NOT ANCHOR IN POSITION FIRMLY, HAVE THE MECHANISM SERVICED BY A TRAINED TECHNICIAN.**

**Anchoring Your Bulkhead**

Your Natare bulkhead or bulkheads are intended to be used only when anchored in position. Any time a bulkhead is moved or repositioned, it must be properly anchored to avoid damage to the bulkhead or injury to swimmers. Depending upon the model of bulkhead, there will be a combination of competition anchors, day-pins or both. Note: day-pins and competition anchors DO NOT use the same anchor sockets. DO NOT attempt to thread competition anchors into day-pin anchor sockets.

1) Day-pin anchors simply slip into the day-pin anchor sockets and are intended for general anchoring of the bulkhead when a rigid and precise competition anchoring is not required. The day-pin anchors will hold the bulkhead in position, but do not lock-down the bulkhead. Day-pin anchors are not intended for anchoring during competition or when racing lanes are in use.

2) Day-pin anchors are typically not intended for use when starting platforms are installed on the bulkhead. While some bulkheads have enough weight to perform adequately when starting platforms are being installed and used, Natare recommends that competition anchors be used when the starting platforms are installed.
3) Competition anchors are a special bronze bolt that is intended to thread into the competition anchor sockets. Once the bulkhead is in position and adjusted to the precise course dimensions, the competition anchors should be tightened snugly, but not over-tightened so that the bulkhead maintains position. Be sure to insert the day-pin anchors in the proper anchor socket.

**READ THIS!**

**DO NOT USE A HAMMER OR OTHER TOOL TO DRIVE OR POUND A DAY-PIN INTO THE ANCHOR SOCKET. USE A WATERPROOF GREASE OR SILICONE LUBRICANT. IF THE DAY-PIN ANCHOR DOES NOT SLIDE INTO THE ANCHOR SOCKET WITH HAND FORCE ONLY, HAVE THE BULKHEAD SERVICED BY A TRAINED TECHNICIAN.**

**READ THIS!**

**INSERT ANCHORING BOLTS CAREFULLY TO AVOID CROSS THREADING. NEVER FORCE OR OVERTIGHTEN BOLTS. NEVER USE EXTENSIONS TO TIGHTEN BOLTS. IF YOUR BULKHEAD DOES NOT ANCHOR IN POSTION FIRMLY, HAVE THE MECHANSIM SERVICED BY A TRAINED TECHNICIAN.**

4) Install the anchor socket covers in the old anchoring position.

5) Reinstall all items removed during bulkhead relocation.

6) Attach all racing lane lines and safety lines in the necessary configuration.

**NOTE: The bulkhead is designed for positioning at the anchoring points only. Do not attempt to use it at any other locations. Damage or injury may result. Position the bulkhead only at anchoring points.**
Typical view of a bulkhead anchoring system. Each carriage and anchoring assembly is fabricated specifically for your pool and gutter. See your project drawings for more details.
Bulkhead Maintenance

Required Maintenance

Regular daily maintenance is a requirement if your Natare moveable bulkhead is to remain free of corrosion. Keeping your Natare bulkhead like new is quite simple. In addition to routine cleaning, the bulkhead should be inspected daily. If any components are loose or broken, they should be tightened or replaced immediately.

**READ THIS!**

Each day, the portion of the bulkhead that is above water should be washed down thoroughly with fresh, clean water. **Do not clean with pool water.** Open all hatches and anchors plates and thoroughly wash off the internal stainless structure.

**READ THIS!**

Inspect the bulkhead for any accumulations of dirt or corrosion. If present, clean thoroughly as described below. In the event the bulkhead exhibits any signs of rust, the effected areas should be cleaned immediately. Refer to the section below for proper cleaning procedures. Determine the cause for the rusting. High chlorine levels, chemical contamination or mild steel (hairpins, etc.) will cause stainless steel to exhibit surface rust.

**READ THIS!**

If the bulkhead is used for training purposes or if the starting platforms, water polo goals or other equipment is installed on the bulkhead, be sure to thoroughly hose off and clean that equipment.

The following illustrations are examples of the damage that can be done by improper water chemistry or a lack of proper bulkhead maintenance.
Proper Care and General Cleaning

The Natare Movable Bulkhead System will provide long service if properly cared for and maintained. Like other pool equipment, a bulkhead requires some light cleaning from time to time. Selected parts of the bulkhead require specialized procedures:

Regular cleaning

**GPM Grating:** The GPM grating is best cleaned with a nylon brush and mild detergent such as *Soft Scrub™*, *Spic and Span™*, *Formula 409™*, or other approved pool cleaner. Virtually any product recommended for pool cleaning can be safely used. VERY SMALL AMOUNTS of detergent will not adversely affect the water quality, and the grating can be cleaned while on the bulkhead. As always, be sure to thoroughly rinse any component after cleaning procedures have been completed.

**b. Stainless Steel Trim and Cover Plates:** The stainless steel components of the bulkhead are easily cleaned with a sponge and mild detergent. This is an effective method for removing deposits of body oils, suntan lotions and light water deposits. Most specialty cleaners for stainless steel are suitable for removing stains or chemical deposits. Be sure to wear the proper protective clothing and follow all manufacturers’ instructions closely.

**c. Large Stainless Steel Areas:** To increase the polish in dull areas and for routine cleaning, use a light detergent and water solution or a cleaner specially designed for cleaning stainless steel in a pool environment such as *Natare’s SS Super Clean Solution*. Sponge the solution on with a cloth, then rinse with clean water and wipe dry. Take special care when cleaning these surfaces and be sure to rub gently with the grain of the metal. Too much pressure will lighten the area and make it difficult to blend into the surrounding material. Never use any type of steel pool cleaning tools, such as steel brushes or steel wool pads, etc. Any of these types of tools will cause rust and leave stain deposits on the bulkhead.

**Annual Cleaning and Inspection**

Whenever the pool is drained for cleaning, or at least once a year, the bulkhead should be cleaned thoroughly. Be sure to follow the recommended cleaning procedures.

**GPM Grating:** All GPM grating should be thoroughly cleaned with a soft nylon brush and detergent. If required, the grating can be removed and soaked to aid in cleaning. Any broken pieces or missing screws should be replaced. Tighten all grating attachments and verify that all spacing of grating sections is proper and correct (no openings larger than .31 inches).

**Stainless Steel Structure and Trim:** Clean all stainless steel as outlined in the light cleaning procedures above. If stubborn stains still remain, *Natare SS Clean and Brighten* should be used for more complete cleaning. Specialized cleaners for stainless steel are also available from Natare. Always wear the appropriate proper protective clothing, gloves, and eyewear. Work with small areas, rinsing each treated piece thoroughly with water before proceeding to the next area.

**Wheel Mechanisms and/or Bearing Plates:** Inspect all parts for wear and performance. All broken parts should be replaced and loose connections tightened. The wheel assemblies should be lubricated with a solid silicone lubricant or other waterproof lubricant.

At least once each year and at regular intervals in-between, the entire bulkhead should be carefully inspected for loose fasteners, worn parts or broken items. Repair or replace such items immediately.
For technical assistance or field service, contact YOUR DISTRIBUTOR OR:

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*Natare SS Clean and Brighten Solution is an extremely aggressive reagent and should be used sparingly and with extreme caution and proper safety equipment including clothing, eye goggles and gloves.

Bulkhead Parts

The following parts list describes some of the more common components of the movable bulkhead system. Keep this list handy in the event that you have to re-order.

**GPM grating:** Specify exact size of panel.

**Grating Hold-Down Bolts:** #10-24x3/4” stainless steel.
(Part number: R11140.010075)

**Stainless Steel Grating Hold-Downs:** Special shaped stainless steel grating retainers that are used to hold the grating in place. (Part number: 36900.H)

**Competition Anchor Bolts:** Used to hold bulkhead in its proper position - 5/8”– 11 x 2-1/2on. HHC Silicon Bronze (Part Number: R17110.062250)

**Day-Pins:** ¾” S/S Quick Release pin (MM98404A780)

**Cleaning Solutions:**

SS Super Cleaning Solution, 22 oz. Bottle (product number: 56350)
SS Super Cleaning Solution, 1 Gallon Unit (product number: 56350.g)

SS SuperClean Plus Solution, 22 oz. bottle (product number: 56350.p)
SS SuperClean Plus Solution, 1 gallon (product number: 56350.pg)

SS Clean and Brighten *(highly aggressive reagent – should be used with extreme caution and safety equipment)*, 1 gallon (product number: 56352.1)
Maintenance of Stainless Steel

Natare Corporation uses a low carbon Type 304, or in some cases Type 316, stainless steel for our equipment because it has been demonstrated to be the best material for the intended purpose and has the best balance between corrosion resistance, strength, and relative cost. We take particular pride and concern to make certain our fabricated systems are both functional and attractive. The owner and operator of the swimming pool, however, must participate in a program of periodic maintenance if the equipment is to retain its original attractive appearance.

We want to ensure that your new systems are maintained in top condition, and we want to discuss the unique characteristics and maintenance requirements of stainless steel, which could lead to maintenance concerns or even the appearance of rusting and corrosion. In order to take better care of your pool and hopefully prevent or resolve housekeeping problems, it is necessary to understand exactly what stainless steel is and how it chemically responds to certain environmental and man-made situations.

In a natural environment, stainless steel is basically rust and corrosion-free. There are some chemicals that can corrode stainless steel, but in nature, these chemicals do not appear in high enough concentrations to affect this alloy. In an altered environment such as a pool, many chemicals can be present which can affect stainless steel adversely. Because these same chemicals would be virtually devastating to other materials or metals, stainless steel is used. In order to help minimize the possibility of corrosion when such chemicals are present, it becomes necessary to understand exactly what is happening and why. With proper maintenance and chemical control, problems with stainless steel corrosion should be minimal.

Common occurrences include "rust" spots, streaks, staining, or a reddish discoloration of the stainless steel material. These conditions are generally symptoms of corrosion, and that is the term we will use for the entire range of occurrences. In discussing these matters, it is important to address numerous misunderstandings regarding "rusting" which arise from a misconception in the mind of the public with regard to stainless steel. While stainless steel has tremendous corrosion resistance, it is neither stain-free nor corrosion-free. It can and will tarnish or corrode under certain circumstances. Nonetheless, these conditions are not representative of a normal or proper pool environment.

The general corrosion resistance of stainless steel is achieved by the use of chromium as an alloying element. The chromium combines with oxygen to form a thin transparent protective film on the surface of the steel. The process that causes this film to form is similar to the manner in which a rust film occurs on mild steel. In the case of stainless steel, this oxide film is quite stable and actually protects the steel in normal atmospheric or mild aqueous environments. Although this protective layer is quite tough, it can be pitted or broken down by the presence of concentrated halide salts. Halide salts (compounds containing chlorine, bromine, iodine, etc.) are among the most aggressive agents that contribute to the tarnishing or pitting of stainless steel, as they break down the thin protective film on the surface. Halide salts are always present because chlorine, bromine, and iodine are used as disinfectants in the treatment of pool water.

Chlorides are the most common form of halides in a pool environment and have been demonstrated to be extremely aggressive toward all metals, including stainless steel and aluminum. Chloride levels in pool water can approach those found in ocean water. Furthermore, a variety of maintenance chemicals and pH adjustment compounds either contain or produce halide salts. The destructive effects of halide salts are magnified by potentially wide swings in pH and temperature.
These halide salts are most damaging when splashed, sprayed or carried onto stainless steel surfaces and allowed to evaporate. The process of evaporation intensifies the level of these salts by many times over and leaves a concentrated solution or deposit on the stainless steel surface that quickly attacks the passive surface.

The only answer to halide salt concentrations and other forms of chemical attack is a conscientious and regular program of preventative maintenance coupled with knowledgeable and appropriate swimming pool operation. Careful control of swimming pool chemistry, along with recognition of the destructive effect of many cleaning compounds, will help to protect the swimming pool walls and gutter. When discoloration or tarnishing of the stainless steel occurs, a variety of specialty cleaners can be used.

As you are probably aware, the “hand broadcasting” of maintenance, cleaning or water treatment chemicals directly into the pool is somewhat common. Cleaning or maintenance chemicals are often applied directly to swimming pool decks and other surrounding areas. Such practices can also lead to staining or rusting problems.

The best possible cure for these problems is a concentrated effort toward the reduction of compounds that contain or produce halide salts in order to minimize the effect of long-term contact between these materials and the stainless steel. Rusting, staining or corrosion problems are almost always linked to chemical concentration or pH. In many pools, chemical levels are frequently too high and chemical consumption is much greater than that required for proper operation. By adjusting these levels to a proper chemical balance, you will have, at the very least, minimized your problem. Combine conscientious chemical control with regular flushing and cleaning of the metal surfaces, and corrosion problems will most likely be eliminated.

The surface of stainless steel can often be contaminated by contact with strong industrial cleaning compounds or through contact with “tramp” or stray metals. Stainless steel is quite hard and will abrade the surface of mild steel on contact. This scraping action leaves myriad pieces and particles of the mild steel impregnated in the surface of the stainless steel. As you might expect, the surface of the stainless steel then begins to show signs of rusting due to the deterioration of these steel particles.

From time to time, pool operators attempt to clean stainless steel materials with a steel wool pad causing devastating results. It is also possible that mild steel can become impregnated in the stainless steel surface from construction activities such as sandblasting, concrete finishing (steel trowels!) or reinforcing steel installation. Even some pool cleaning tools and accessories are made from mild or carbon steel. Aluminum will also be abraded by stainless steel and can produce localized staining or black, rust-like deposits. Even steel SCUBA tanks can impart mild steel to stainless steel pool equipment.

Many chemicals used to clean or treat concrete or ceramic tile will also establish conditions that are conducive to rusting or corrosion. Proper care during construction and a thorough cleaning of all stainless steel equipment immediately after the pool is first filled will eliminate many of these potential problems.

Increasing staff’s knowledge concerning the use of chemical disinfectants and cleansers is of immediate importance. There are pool operator courses and scores of literature to help efficiently operate a facility. The first step is to gather information on your particular chemical levels and to maintain pool water chemistry at recommended levels. Subsequently, the stainless steel must be thoroughly cleaned and neutralized or "passivated" (a process of re-establishing the oxide film). With
a conscientious and constant program of pool maintenance, the problems of corrosion will be eliminated.

A regular cleaning program is an absolute must!

No saltwater sailor would think of putting his boat away without first washing down the railings and stainless steel fittings with fresh water. Likewise, no diver would store his gear without first rinsing away all traces of saltwater. No cook would consider leaving his stainless steel cookware and countertops un-cleaned. Stainless steel in a swimming pool environment is no different and requires the same care and attention.

A regular cleaning program consisting of thorough and complete flushing with fresh water and wiping down of the stainless surface will minimize or eliminate the need for heavy cleaning and will greatly reduce or eliminate rusting and corrosion. Stainless steel railings, bulkhead trim sections, exposed edges of stainless steel gutter systems and other areas that are not regularly submerged will also benefit from a regular wiping down with a rag lightly coated with lemon oil polish or silicone spray. This will remove various scale and corrosion product while helping to protect the stainless steel. A high quality wax can be applied to stainless steel (above the water line) to seal and protect the surface. Small scrapes and scratches should be buffed out or polished to eliminate a crevice for corrosive materials to deposit.

This concept is best observed by inspecting your handrails or ladders. Most likely, you will find the area where your hands regularly grab the stainless steel tubing to be clean, shiny and free of corrosion. The lower parts of the tubing, particularly those just next to the deck, will generally be stained or rusty. This occurs because the wet hands regularly “clean” the tubing in certain areas while those next to the deck are seldom cleaned.

When traces of rust, surface deposits or corrosion do appear, more complete cleaning is required. This process consists of washing, cleansing and flushing the stainless steel surface with a specialized cleaner to remove all traces of the corrosive oxide scale which is seen as rust, film, or streaks. One product that is ideal for regular cleaning is Natare’s SS SuperClean, which is also safe to use in a pool environment. Light scrubbing of the steel surface in the direction of the metal grain with the appropriate cleaning solution on a green Scotch Brite™ pad will also help remove this scale. Once all traces of surface deposits or rust are removed, the surface must again be flushed with clear water. Of course, proper safety precautions must be followed in accordance with the recommendations of the cleaning product manufacturer.

For cleaning in cases where corrosion, rusting or staining is well established or where surface contamination is suspected, professional, trained maintenance personnel can use special cleaning solutions to remove even heavy corrosion. Natare can assist with recommendations and procedures for dealing with such problems.
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It is important to note that even mild or other chemical solutions can be dangerous, cause severe burns or blindness. Always wear protective clothing, eyewear and gloves, and strictly follow proper safety procedures.

ScotchBrite™ is a registered trademark of the 3M Corporation.

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WARNING

Acids, cleaning solutions and other chemicals can be extremely dangerous. Skin irritation, severe burns or blindness can result from improper use. Always read instructions carefully, have trained personnel assist with the use of such products and dispose of properly.

Natare also provides cleaning products that are recommended for use in cleaning stainless steel materials in a swimming pool environment. These products have been tested by Natare and are approved as safe and satisfactory for cleaning of Natare stainless steel products. Natare SS Super Clean is an organic cleaner intended for regular cleaning and conditioning of stainless steel in a swimming pool or marine environment. Natare SS Clean and Brightener* is available for regular cleaning and brightening of stainless steel and is suitable for removing light corrosion. These products are available in 22 oz bottles and 1 gallon units. Natare has other products available when more advanced corrosion or rusting is occurring, but such products are professional cleaning products intended for use in commercial and industrial cleaning by careful, trained maintenance personnel. They are not intended for casual or residential use.

A number of proprietary cleaning products are commercially available which purport to clean and protect stainless. As a general rule, any cleaning product labeled and intended for cleaning surfaces in a pool or spa will be safe to use as long as directions are carefully followed and the cleaned area thoroughly flushed with water. Regardless, while many of these compounds could be quite effective, we do not have formulation information or know whether a particular product or products are safe for use with swimming pool water.

* Natare SS Clean and Brighten Solution is an extremely aggressive reagent and should be used sparingly and with extreme caution and proper safety equipment including clothing, eye goggles and gloves.

READ THIS!  ⚠

Get specific advice and recommendations from your supplier before using such chemicals on your equipment and systems. Stainless steel can be damaged or stained quite extensively by incorrect product selection or the wrong cleaning technique, and many chemicals can actually be hazardous to swimmers if trace amounts enter pool water during the cleaning process.

By following these operation and maintenance guidelines, your stainless steel systems should remain functional and attractive for many years. If Natare can be of further assistance in keeping your new systems “Like New”, or should you have further questions or comments, please Natare or an authorized Natare distributor at any time.
Effects of Elevated TDS Levels in Stainless Steel Pools & Spas

Over the past decade, many pool operators have consciously reduce the amount of make-up water added to pools in an effort to control the cost of water. Additionally, the use of salt chlorine generation systems is beginning to be seen in public and commercial pools. At the same time, some “pool experts” have been promoting the idea that TDS (total dissolved solids) no longer matters in pool maintenance, which is contradictory to the long accepted practice of maintaining TDS at 1,500-ppm or lower.

Stainless steel is generally regarded as low maintenance and typically does not corrode in a properly maintained pool environment. Natare has been manufacture stainless steel pools and pool equipment for decades, and each piece of equipment undergoes an extensive and through cleaning after fabrication and the stainless steel is passivated prior to shipment. Typically, corrosion or rusting is related to water chemistry, improper cleaning techniques or a lack of regular maintenance, but often TDS (total dissolved solids) are found to be the root cause for the continuing problems with corrosion and rusting. Excessively high levels of total dissolved solids in pool water promote corrosion and exacerbate the tendency for saline attack.

TDS is the measure of all combined content of all inorganic and organic substances contained in a liquid that are present in a molecular, ionized, or micro-granular (colloidal) suspended form. This measure is expressed as PPM (parts per million) or mg/ml (milligrams per liter), and the terms can be used interchangeably. TDS are indefinitely suspended in solution and are differentiated from total suspended solids (TSS), which affect the clarity of pool water, but which can be removed from the pool water by filtration. TDS cannot be reduced by filtration, nor will TDS ever “settle-out”.

In the case of a swimming pool, the major component of TDS is salt or a “chloride”, which is the end product of the chemical treatment of pool water. The primary swimming pool disinfectant and oxidizer is hypochlorous acid, and this acid combines with various alkaline or “base” compounds to form chlorides. Furthermore, calcium and sodium based chlorinating compounds by nature are extremely alkaline and contribute to the “hardness” of pool water.

Corrosion in a high TDS environment where chlorides constitute a large percentage of the TDS levels can occur in many forms, and many different corrosion types occur simultaneously. Commonly, one type of corrosion can accelerate the development of other forms, and any corrosion creates the opportunity for deterioration. Crevice corrosion occurs spontaneously in the present of high TDS and chlorides, and stress corrosion cracking in weldments and fabricated stainless components can also occur. Once corrosion is present, the rate of corrosion increases exponentially.

As TDS increases, so does the conductivity of a solution. In fact, conductivity is the tool used to measure TDS. Since corrosion is electrical and involves a flow or exchange of electrons, the propensity for corrosion increases proportionately with an increase in TDS. Electrolysis, stray current and galvanic corrosion can begin when TDS reaches threshold levels while such corrosion would not be prevalent at lower TDS levels. Increased conductivity and the evaporation cycle on wetted surfaces of stainless steel in a pool environment create an ideal environment for corrosion when subjected to high TDS.

Some sources have suggested that corrosion will not be a problem at elevated TDS levels, but such comments are simplistic. Elevated TDS is typically the result of high chlorides, and there is considerable scientific literature that discusses the relationship of chloride concentration to corrosion.
of stainless steel alloys as well as other metals and metal alloys. It has been well documented that even lower concentrations of chlorides can promote pitting in stainless steels and localized attack, particularly in weld joints. In locations receiving significant and repeated pool water misting, but limited cleaning or flushing such as those under the grating and above the perimeter gutter, the evaporation of pool water makes the local environment far more aggressive than the TDS measurements suggest.

In short, the presence of high TDS causes the pool water to become corrosive towards many pool components. While the first attack, and typically the most severe corrosion is seen on areas subject to the evaporation cycle, corrosion can and will occur on metallic items above and below the water line as well as in any metallic components of the mechanical plant. Even concrete and the internal reinforcing steel will ultimately be attacked by high TDS pool water.

Corrosion of stainless steel from high TDS in a pool environment is caused by a chain of events beginning with water from the pool surface falling and splashing into stainless steel or where surface evaporation and agitation causes pool water to become areolized. Water is splashed onto the surface of the stainless steel, but is rarely cleaned or removed thus concentrating the corrosion tendencies of the pool water and accelerates the corrosion process. High TDS in the fluid, mist or vapor that deposits onto the stainless steel dramatically concentrates the TDS and triggers or accelerates the corrosive process.

Corrosive deterioration begins where localized forms of corrosion are typically concentrated at and radiating outward from epicenter where the corrosive event began. This epicenter is usually the result of the concentration of a halide or salt solution where the evaporation of water containing salts forms a concentration cell. Surface roughness, damage, or scratches in the material can contribute to the onset of corrosion, but simple evaporation can create a point of salt concentration that will destroy the passive or corrosion-resisting surface of stainless steel.

Corrosion related to high TDS is typically seen on the bottom of pool ladders, on exposed stainless steel immediately above the water line, on starting platforms, pool lifts, and on structural members immediately below bulkhead grating. Stainless steel members that extend over perimeter gutter systems often show evidence of such corrosion. However, very little if any corrosion is seen on stainless steel below water.

Stainless steel areas such as crevices, areas under the cladding of a bulkhead or below the top surface of a starting platform are rarely, if ever cleaned, and the corrosive process continues unchecked. Similar evidence of is commonly seen on ladders, lifeguard chairs and other stainless steel equipment in the area just above the pool deck where regular cleaning may not be occurring. When the level of corrosion becomes advanced or results in pitting, advanced because of the high TDS in the pool water which means that even regular cleaning is inadequate to remove the surface contamination before damage occurs.

Many water quality standards set an upper limit for TDS of 1,000-ppm. In pools, however, the accepted levels for TDS have historically been 1,500-ppm. Regardless, we believe that 1,500-ppm should be considered a maximum value so that the corrosive tendencies of swimming pool water are minimized. It is well documented that the presence of TDS levels in excess of 1000-ppm in combination with organic acids, organic compounds and halides can and will contribute to corrosion in the form of rusting, pitting and pin-hole corrosion. Such corrosion begins on any metallic items in the pool and pool area. High TDS can also contribute to excessive turbidity of a lack of clarity in pool water and can also cause the precipitation of suspended matter in pool water or cause material in suspension to undergo a phase change from solution to suspension.
Based upon direct observation and testing pool water, we have often observed TDS levels in a range of 3,000 to 6,000-ppm (parts per million), despite the industry standard recommendation that TDS should never be allowed to exceed 1500-ppm. Many sources recommend TDS maintained below 1200-ppm. Such levels are consistent with normal operating standards for pool facilities and are considered to be the best practice for TDS in swimming pool water. For comparison, the upper limit for “fresh water” is considered to be 500-ppm and the United States has established a similar water quality standard for palatability of drinking water. In addition to being a trigger for a variety of corrosive conditions, high TDS levels in swimming pool water can distort pool water chemistry test results and cause a variety of water balance and operation issues.

To compensate for the hardness added to the pool water by water treatment chemicals, acidic compounds such as muriatic acid are added to pool water to maintain proper pH, alkalinity, and hardness levels. These acids react with the base (alkaline) portion of pool water treatment chemicals to form salt or “halides”. All halides, and in particular chlorides such as sodium chloride, are the natural enemy of stainless steel as they break down the passive layer on the surface of the stainless steel, which is what provides the corrosion resistance. This attack upon the passive layer promotes the process of corrosion.

As a result of evaporation and continual addition of water treatment chemicals to the pool, TDS levels will increase unless the amount of fresh water added to the pool is adequate to dilute or offset such increase. In most pools, this requires that significant amounts of make-up water are added to the pool each day. To do so, an equivalent amount of water must be drained from the pool, lost through splash-out or other forms of water loss. In pools with high bather loads requiring high chemical dosing rates, the amounts of makeup water required to maintain TDS at appropriate levels can be quite substantial and may often amount to replacing a large percentage of pool volume each month. There are no reasonable or efficient ways to reduce TDS other than the addition of makeup water, and that makeup water must have a lower TDS levels than the pool. While TDS reduction can be accomplished through reverse osmosis, that process is neither efficient, nor cost effective for swimming pools.

Unfortunately for some pool facilities, the quality of pool makeup water available in many parts of the country can create difficulties in maintaining TDS as the locally supplied water may have a TDS level at or above the recommended pool levels. In such cases, little can be done to reduce TDS through dilution and the only solution lies in reducing the amounts of water treatment chemicals, even more attention to maintaining “steady-state” pool conditions or the adoption of ozone or UV treatment systems to enhance the oxidation of organic matter in the pool without increasing chemical dosing.

The addition of large amounts of fresh water is not an unusual event. In fact, fresh water is highly recommended, particularly where the fresh water supplies are of good quality. Most experts in pool sanitation and water chemistry agree that regular dilution through fresh water is critically important to proper pool operation. In many pools, water replacement rates can exceed 20% per month of pool volume or higher. While the addition of large volumes of fresh water can be a cost item, the benefits to both the users and the facility far outweigh the cost. Given the requirements of the EPA for TDS in portable water, the quality of the water is in most municipal systems is quite acceptable. On the other hand, well water can often have high amounts of TDS. Testing is source water is important in determining dilution programs and overall water chemistry maintenance.

300 Series stainless steel is typically used in swimming pool environments, and type 316 stainless is somewhat less susceptible to corrosion than type 304, which is the standard for metallic pool items
such as gutter systems, filters, pool equipment, and bulkheads. However, conditions that lead to significant corrosion in type 304 will also result in corrosion to 316 in long term exposure.

With proper control of TDS and a reduction of halides through reduced water treatment chemicals, the conditions for rusting and other forms of corrosion in a pool environment will be reduced significantly and stainless steel will perform quite satisfactorily. However, if corrosion is allowed to continue through neglect or inadequate maintenance, extensive cleaning may be required to remove the corrosion product and passivation of the surface to return the stainless steel to its original corrosion-resistant condition.

**RECOMMENDED POOL AND SPA WATER CHEMISTRY STANDARDS**

Proper pool and water feature operation requires careful attention to water chemistry and chemical levels. Pool operators must understand water chemistry and pay careful attention to maintaining those levels.

**READ THIS!**

<table>
<thead>
<tr>
<th><strong>WARNING</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Improper water chemistry or chemical levels that exceed recommended values or the improper addition of chemicals to a swimming pool or spa can be dangerous to users and may cause serious damage to equipment or pool systems</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Recommended Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxidation reduction potential (ORP)</td>
<td>750 - 900 millivolts (mV) (commercial)</td>
</tr>
<tr>
<td></td>
<td>865 mV to kill (Cryptosporidium, Giardia and viral inactivation)</td>
</tr>
<tr>
<td>Free available chlorine</td>
<td>1.5 - 3.0 ppm or as needed to maintain a 750 mV ORP</td>
</tr>
<tr>
<td>Combined available chlorine</td>
<td>&lt; 0.3 ppm</td>
</tr>
<tr>
<td>Total available chlorine</td>
<td>No more than 0.2 ppm higher than free available chlorine</td>
</tr>
<tr>
<td>Super chlorination</td>
<td>As required for breakpoint, but no more than 10 ppm. Maintaining high chlorine residuals for extended periods will cause damage to pool components and systems. Use extreme caution when super chlorinating</td>
</tr>
<tr>
<td>Total bromine</td>
<td>3.0 - 6.0 ppm or as needed to maintain a 750 mV ORP</td>
</tr>
<tr>
<td>Polymeric biguanide (PHMB)</td>
<td>30 - 50 ppm (never combine with chlorine)</td>
</tr>
<tr>
<td>Hydrogen peroxide</td>
<td>30-100 ppm</td>
</tr>
<tr>
<td>Salinity</td>
<td>See Total Dissolved Solids</td>
</tr>
<tr>
<td>Sulfates</td>
<td>&lt; 200 ppm</td>
</tr>
<tr>
<td>pH</td>
<td>7.2 - 7.6</td>
</tr>
<tr>
<td>Acid or base demand</td>
<td>Neither</td>
</tr>
<tr>
<td>Total alkalinity</td>
<td>100 - 120 ppm</td>
</tr>
<tr>
<td>Calcium hardness</td>
<td>220 - 400 ppm (dependent upon sanitizer used)</td>
</tr>
<tr>
<td>Langlier Saturation Index</td>
<td>(-.5) to (+.5) damage will occur outside these values!</td>
</tr>
<tr>
<td>Total dissolved solids (TDS)</td>
<td>&lt; 1,500 or 1,000 ppm above start-up count</td>
</tr>
<tr>
<td>Nitrate</td>
<td>&lt; 10 mg/L (Uncontrollable algae growth at 25 mg/L)</td>
</tr>
<tr>
<td>Phosphates</td>
<td>0.2 - 0.5 maximum</td>
</tr>
<tr>
<td>Clarity</td>
<td>Crystal clear (silver dollar at deepest point)</td>
</tr>
<tr>
<td></td>
<td>0.25 Nephelometric Turbidity Units (NTU)</td>
</tr>
<tr>
<td></td>
<td>0.2 Jackson Turbidity Units (JTU)</td>
</tr>
<tr>
<td>Water temperature (desirable)</td>
<td>104° F (maximum spas)</td>
</tr>
<tr>
<td>(Therapy pools)</td>
<td>86° - 94° F</td>
</tr>
<tr>
<td>(Multiple-use and recreational pools)</td>
<td>83° - 85° F</td>
</tr>
<tr>
<td>(Competitive, lap or exercise pools)</td>
<td>78° - 82° F</td>
</tr>
</tbody>
</table>
In addition to these recommended values, the presence of copper, iron or other metals can and will cause staining, discoloration and permanent damage to your pool systems. If metals are present in your pool or staining occurs, always seek professional advice to ensure that proper conditions are maintained.

Maintenance of Grates and Grating

1. Proper Care

Natare stainless steel bulkhead systems are provided with a highly durable, corrosion-resistant grating, which incorporates a slip-resistant tread. Proper care and maintenance of your grating is essential to the safety of persons using the pool or water feature and to the operation of your systems.

All fasteners, hold-downs and other devices intended to hold grating in place should be inspected regularly to ensure that the gratings are securely fastened in place. Wave actions, swimmers and pool-cleaning operations can loosen these fastenings, and active, busy facilities will require more frequent inspection and maintenance.

Gratings will occasionally break, crack, deteriorate or be damaged from swimmers or pool cleaning operations. All gratings on bulkheads or other areas should be regularly inspected to ensure the safety of swimmers and to provide proper operation of the pool, spa or water feature systems.

Natare recommends daily inspection and maintenance of grates and grating systems, particularly in active, busy swimming pools.

**READ THIS!**

**WARNING**

Broken, loose or missing grates or gratings can cause serious injury or DEATH. Never allow anyone to use or enter a pool if the grates or gratings on the bulkhead are not secured, broken, loose or missing. Drowning, entrapment, amputation of fingers and toes or other serious injuries can occur.

Inspect and maintain your grates and gratings regularly!

2. Grates and Grating Cleaning Procedures

Regular cleaning and maintenance is necessary for all grates and grating systems. Dirt and other debris can accumulate on the surface, which interferes with pool operation and can make the grating slippery. Regular cleaning, including scrubbing with a stiff bristle brush and a weak detergent or cleaning solution is necessary. Virtually any pool-cleaning product can be used to clean the grating. Read instructions and follow directions carefully.
Securing the Bulkhead in an Empty Pool or During the Off-Season

While it is impossible to tell you everything you need to know about properly supporting your bulkhead, the following information is intended to provide an overview of the concepts involved in properly supporting the bulkhead when the pool is drained or the water level is lowered significantly.

**WARNING**

Failure to correctly implement proper procedures or the use of improper or unsuitable materials will cause damage to the bulkheads or surrounding pool areas and could result in injury to the persons involved in the work.

Detail A (see next page) illustrates the method of supporting the bulkhead through the use of timbers and bottle jacks to transfer the weight from the pool edge to the pool floor prior to draining water from the pool. This is a temporary method to support the bulkhead only while the pool is being drained so that the cribbing shown on detail B (see next page) can be installed once the water is out of the pool. These supports must be installed before pool draining begins.

If there is any reason for concern with the integrity of the fixed and variable buoyancy chambers, do not remove more than a few inches of water from the pool without bracing in place. Doing so could cause damage to the bulkhead or the perimeter pool surround.

Once the jacks and shoring are in place, but prior to draining the pool, all variable buoyancy chamber valves should be opened to allow the bulkhead weight to settle onto the wood blocks. At that point, the jacks are used to evenly raise the bulkhead just enough to ensure that no load is placed on the perimeter gutter. Approximately one inch of clearance between the gutter surface and the bearing pads at each end of the bulkhead is required.

The metal plate shown under the bottle jack is to spread the load across the pool bottom to avoid point loads that could crack or damage the pool bottom.

Once the temporary cribbing is installed, leveled and shimmed close against the bottom of the bulkheads as shown in detail B, the jacks are released so that the bulkheads are resting upon the cribbing for the duration of the work.

When work is complete, and you are ready to refill the pool, the jacks are used to raise the bulkheads slightly so that the cribbing can be removed.

**Do not allow persons on or near the bulkhead while the bulkhead is being raised and supported with the bottle jacks.**
Do not use the bulkheads as a platform or foot traffic while the pool is empty.

Use extreme care in selecting, installing and utilizing the materials and equipment used to lift the bulkhead and to shore (support) the structure.
What makes the highest quality Moveable Bulkhead System even better?

**Natare Inspect and Service Plus.** Innovative services from Natare to protect your investment and keep your bulkhead system looking like new! Natare has programs available to provide annual inspection services, inspection maintenance, and service contracts to help you properly care for and maintain your bulkhead.

Prevent minor maintenance issues from becoming major problems. Ensure that your pool facility operates properly and with low annual costs while preventing maintenance surprises. Natare’s annual field inspection services can help you better maintain your bulkhead system by identifying proper maintenance requirements and developing proper programs to keep your new bulkhead in top condition. Natare can provide everything from required preventative maintenance to full field service—often at a cost equal-to or below your current costs. Plus, you gain the promise that your maintenance and service costs are controlled, scheduled and guaranteed.

To schedule your annual inspection or to develop an inspection, maintenance and service contract tailored to your facility and budget, contact Natare today.